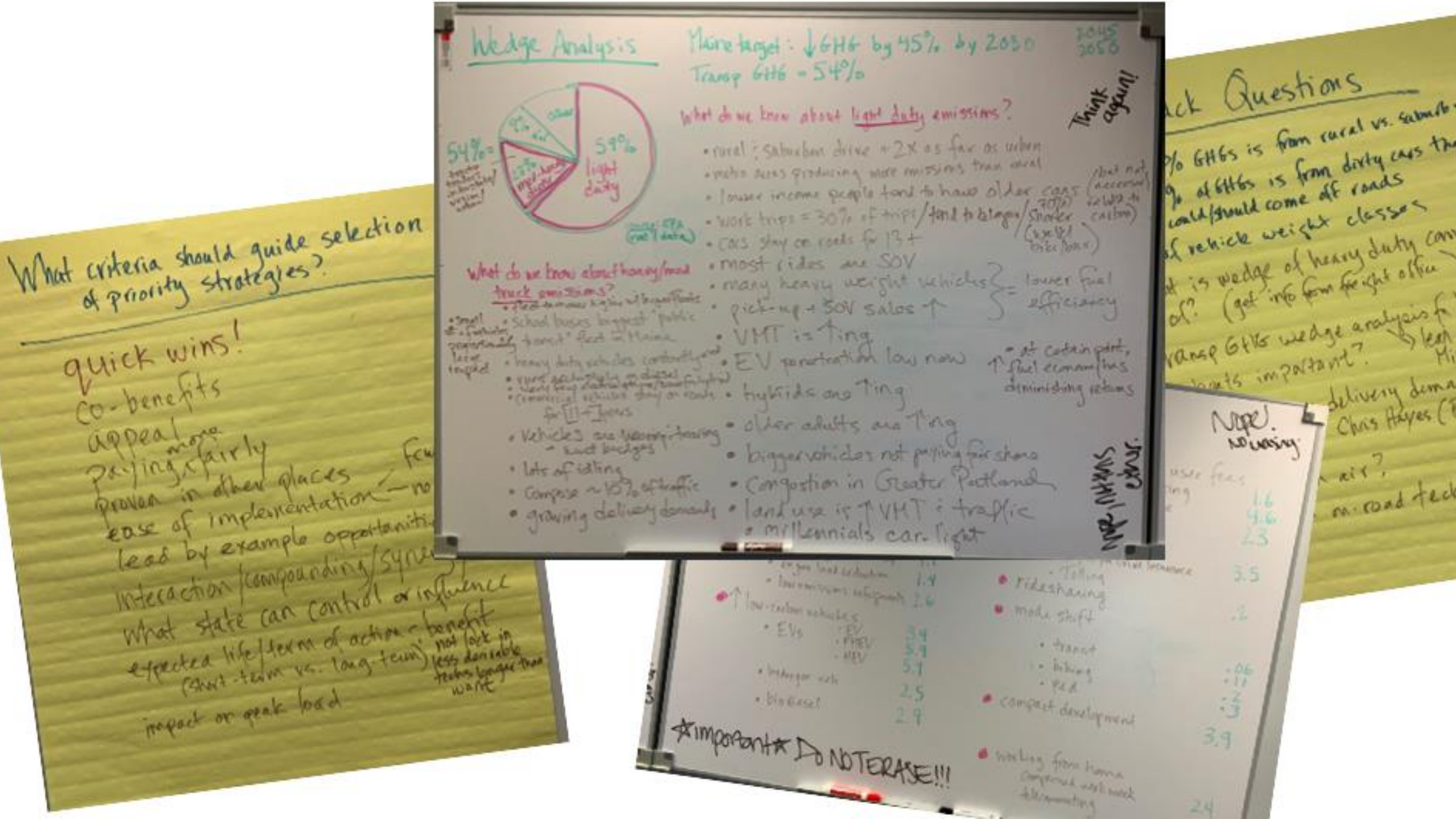
Developing & Prioritizing Mitigation Strategies

Maine Climate Council's
Transportation Working Group
December 16, 2019



What criteria should guide selection of priority strategies?
quick wins!
co-benefits
appeal
paying more fairly
proven in other places
ease of implementation
lead by example opportunities
interaction/compounding/synergy
what state can control or influence
expected life/term of action - benefit (short-term vs. long-term)
not lock in less desirable techs longer than want
impact on peak load
Wedge Analysis
Maine target: ↓GHG by 45% by 2030
Transp GHG = 54%
2045
2050
54% =
59% light duty
other
What do we know about light duty emissions?
Think again!
• rural & suburban drive ≈ 2X as far as urban
• metro areas producing more emissions than rural
• lower income people tend to have older cars
• work trips = 30% of trips
• cars stay on roads for 13+
• most rides are SOV
• many heavy weight vehicles
= lower fuel efficiency
• pick-up + SOV sales ↑
• VMT is ↑ing
• EV penetration low now
• hybrids are ↑ing
• older adults are ↑ing
• bigger vehicles not paying fair share
• congestion in Greater Portland
• land use is ↑VMT & traffic
• millennials car-light
What do we know about heavy/med truck emissions?
• School buses biggest "public transit" fleet in Maine
• heavy duty vehicles
• vehicles are heavy, tearing up roads
• lots of idling
• comprise ~15% of traffic
• growing delivery demands
Nope!
No erasing
☆important☆ DO NOT ERASE!!!
↑ low-carbon vehicles
• EVs
• BEV
• PHEV
• HEV
• hydrogen vehicles
• biodiesel
• ridesharing
• mode shift
• transit
• biking
• ped
• compact development
• working from home
3.4
5.9
5.1
2.5
2.9
3.5
3.9
2.4
Questions
% GHGs is from rural vs. suburban
% of GHGs is from dirty cars that could/should come off roads
of vehicle weight classes
is wedge of heavy duty
(get info from freight office)
transp GHG wedge analysis
important?
delivery demand
Chris Hayes
air?
on-road tech

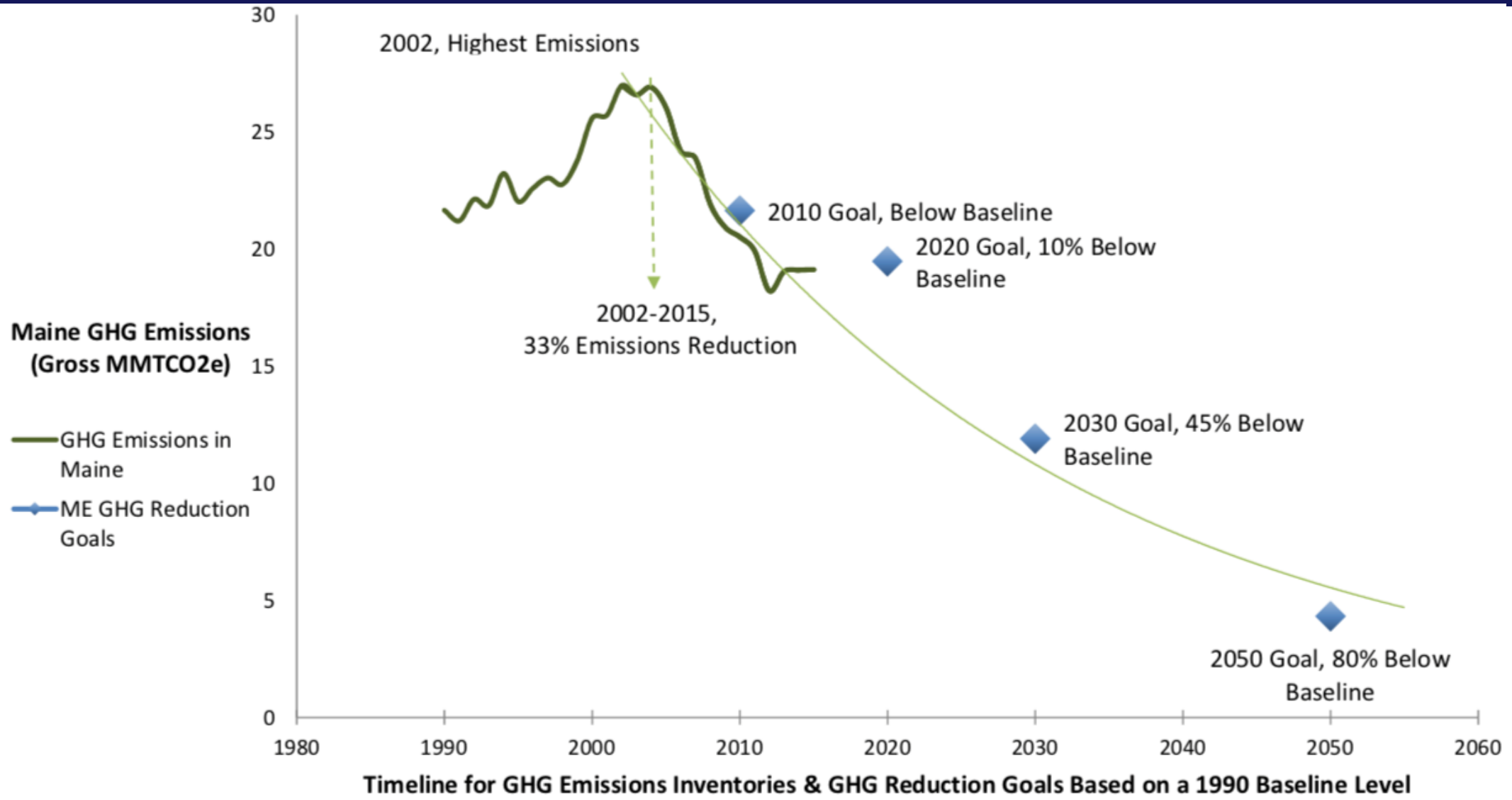
Framework

DATA CHECKS

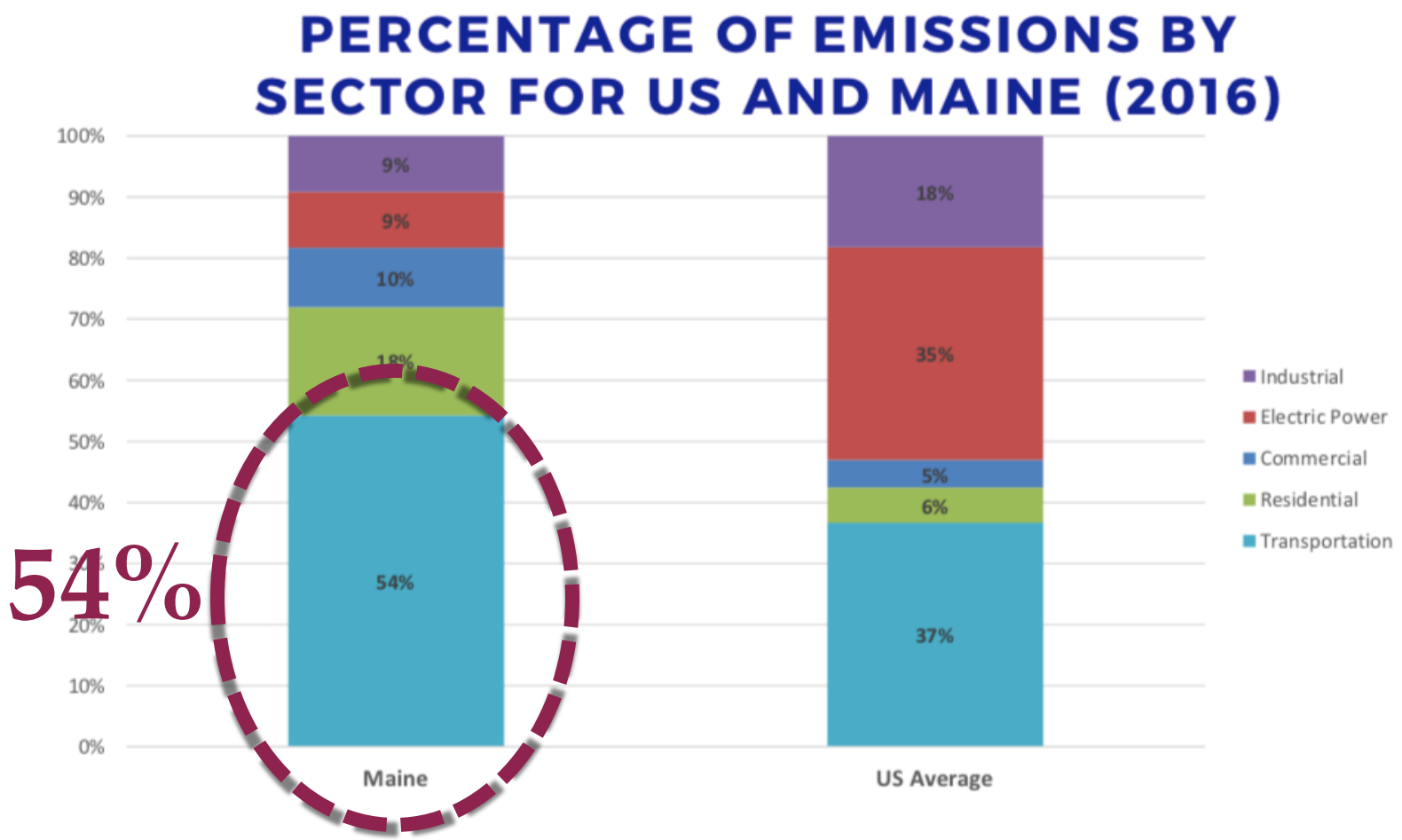
1) **Set Transportation Wedge Goal.**
2) **Analyze Wedge.** Define significant drivers of GHGs.
3) **Understand Drivers.** Explore what we know about those key sources of GHGs.
4) **Brainstorm Strategies.** Create “strategy buckets” that address those drivers.
5) **Set Criteria and Methodology**. Define what matters most for strategies. Develop quantitative and qualitative evaluation methods for comparing relative effectiveness of strategies.
6) **Prioritize Strategies.** Gather information on relative effectiveness of strategies to address drivers and meet criteria.

Set Goal for Transportation Wedge

State Goals

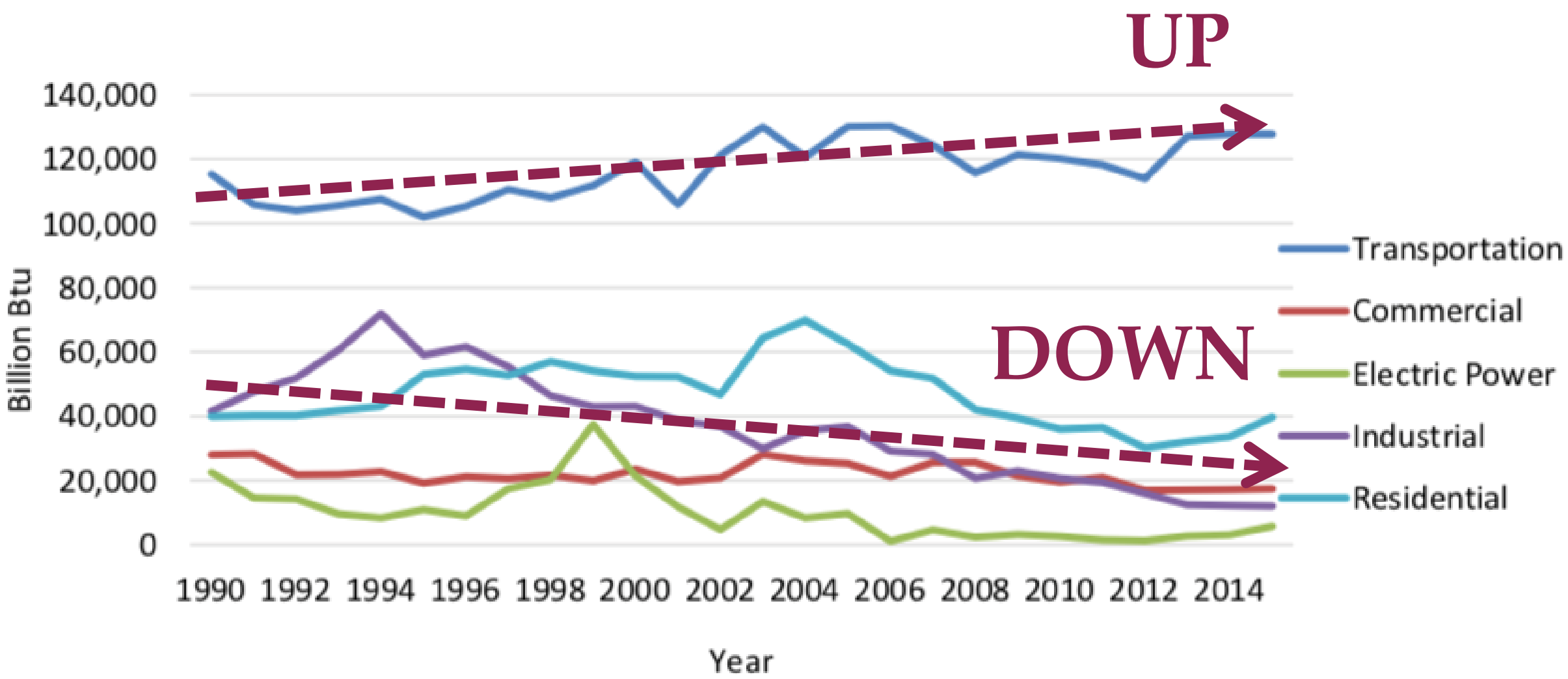

Maine GHG Emissions (Gross MMTCO2e)
GHG Emissions in Maine
ME GHG Reduction Goals
30
25
20
15
10
5
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2002, Highest Emissions
2002-2015, 33% Emissions Reduction
2010 Goal, Below Baseline
2020 Goal, 10% Below Baseline
2030 Goal, 45% Below Baseline
2050 Goal, 80% Below Baseline
Timeline for GHG Emissions Inventories & GHG Reduction Goals Based on a 1990 Baseline Level

Maine's Transportation Wedge



Source: EIA, SEDS Database

Wedge Trend Line



Transportation Wedge Goal

Given that…

- Transportation emits 54% emissions
- Transportation emissions are growing

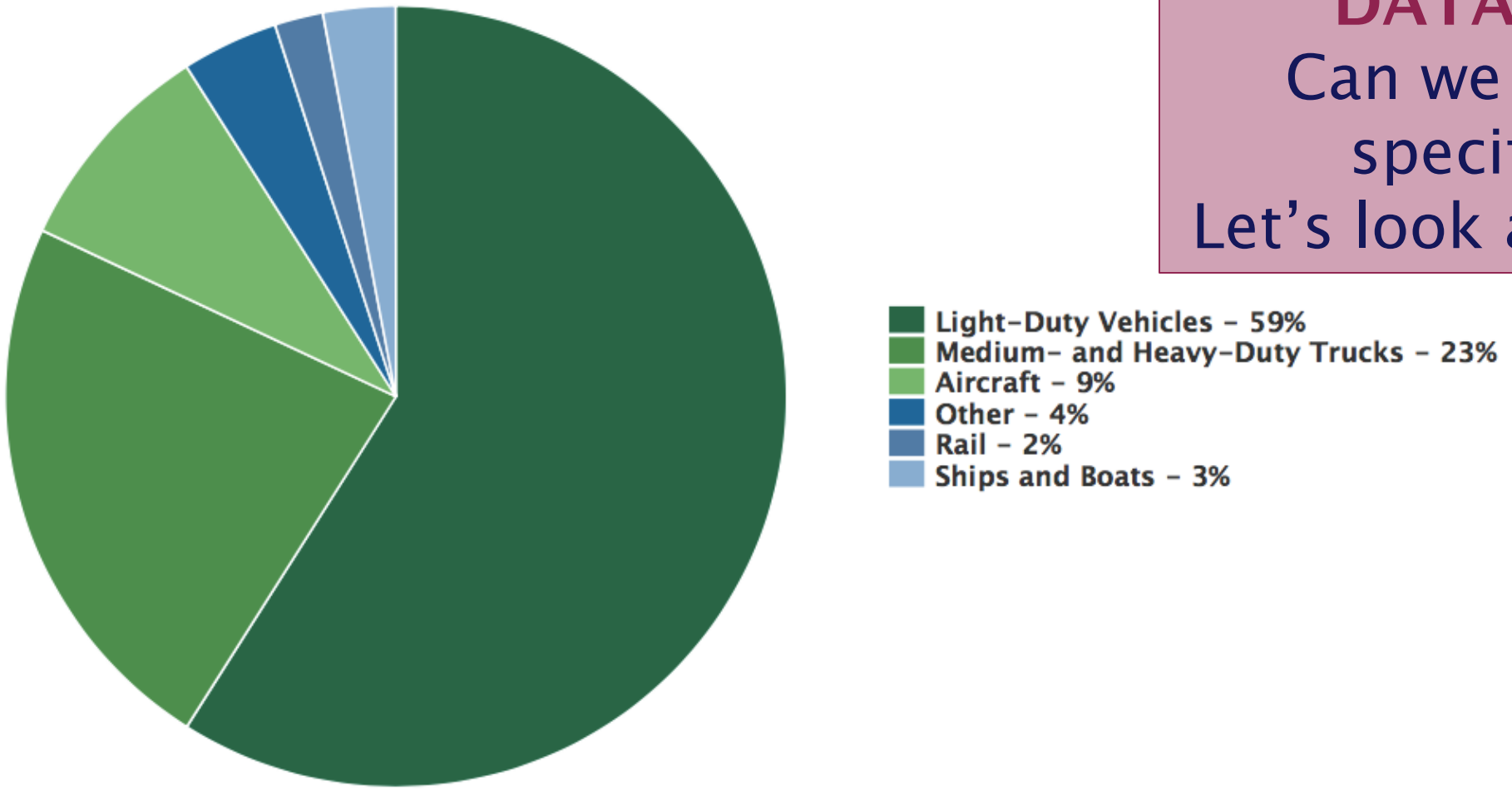
….What should our working group's GHG reduction goal be for the transportation wedge?

DATA CHECK:
Is there less opportunity for significant GHG reductions from other sectors?

Analyze Wedge and Subwedges

Wedges in the Wedge

2017 U.S. Transportation Sector GHG Emissions by Source



DATA CHECK:
Can we get Maine specific data?
Let's look at Minnesota.

2. Understand Drivers

What do we know about light duty vehicle use in Maine?

- **Mainers drive 13,500 miles/year**.
- **Vehicle miles travelled are increasing.**
- **Land use is driving increases in traffic and travel distances.**
- **Congestion increasing in Greater Portland.**
- **Most trips are by people driving alone**.
- **30% of trips are work trips** which are longer distances than other types of trips.
- **Older adults are growing segment of population.**
- **Growing market of people wanting to live car light or free.**
- **Rural and suburban drivers drive a lot:** 2x as much as urban drivers.
- **Urban areas generate more total emissions.**

What do we know about light duty vehicle use in Maine?

- **Cars stay on roads for 13+ years.**
- **Sales increasing of lower efficiency vehicles.** Pick-ups and heavy weight vehicles preferred.
- **Bigger vehicles aren't paying a fair share** of road maintenance.
- **Increasing fuel economy has diminishing returns**.
- **Hybrid sales are increasing.**
- **EV penetration is low now.**
- **EV market options are increasing.**
- **People have "range anxiety".**

DATA CHECKS

- What percentage of GHGs are from rural vs. suburban vs. urban drivers?
- What percentage of the vehicle fleet are dirty/ low fuel economy that should come off the roads?

What do we know about heavy duty vehicle use in Maine?

- **Compose 10% of traffic, but over 20% of emissions**.
- **Used Constantly.** Trucks are continually in use to transport freight.
- **Growing Delivery Services.** With online shopping, truck deliveries are increasing.
- **Long Use Life**. Trucks stay on the road for more years than cars.
- **Large Fleets Turnover** faster than smaller fleets.
- **Lots of Idling.**
- **Trucks disproportionately wear out infrastructure.**
- **Use Diesel.** Our truck fleets run exclusively on diesel.
- **Few Electric Options** available on the market.
- **School Buses are a Biggest Public Transit Fleet in Maine.**

DATA CHECKS

- What are the sub-wedges in the heavy duty wedge?
- What impact does online shoping delivery have on net GHGs?
- What percentage of each weight class do we have in Maine?
- Are boat emissions important?
- What are the causes of airplane GHGs?
- What are the viable road technology upgrades available for trucks?
- Will autonomous trucks reduce GHGs?

Brainstorm Strategies

The Two Big Strategies

Vehicles pollute less

+

People drive less

=

Less transportation carbon pollution

Vehicles pollute less

Increase vehicle efficiency

- Increase diesel engine efficiency– 4.1
- Improve driver behavior & vehicle maintenance – 3.7
- Use low emissions refrigerants – 2.6
- Reduce speed limits – 2.0
- Maintain fuel economy standard
- Take (and keep) inefficient vehicles off the road

Increase low-carbon vehicles

- Increase EVs – 3.4
- Increase PHEVs – 5.9
- Increase HEVs – 5.9
- Transition to biodiesel – 2.9
- Increase hydrogen vehicles – 2.5

DATA CHECK:
What are assumptions behind green numbers?

People drive less

Driving cost reflects true cost

- Cap and trade – 4.6
- Pay as you drive insurance – 3.5
- Miles driven fee – 2.3
- Congestion pricing – 1.6
- Increase fuel tax
- Increase tolls

DATA CHECK:
What are assumptions behind green numbers?

Walkable places

- Compact development – 3.9

Working from Home

- Compressed work week – 2.4
- Telecommuting – 0.6

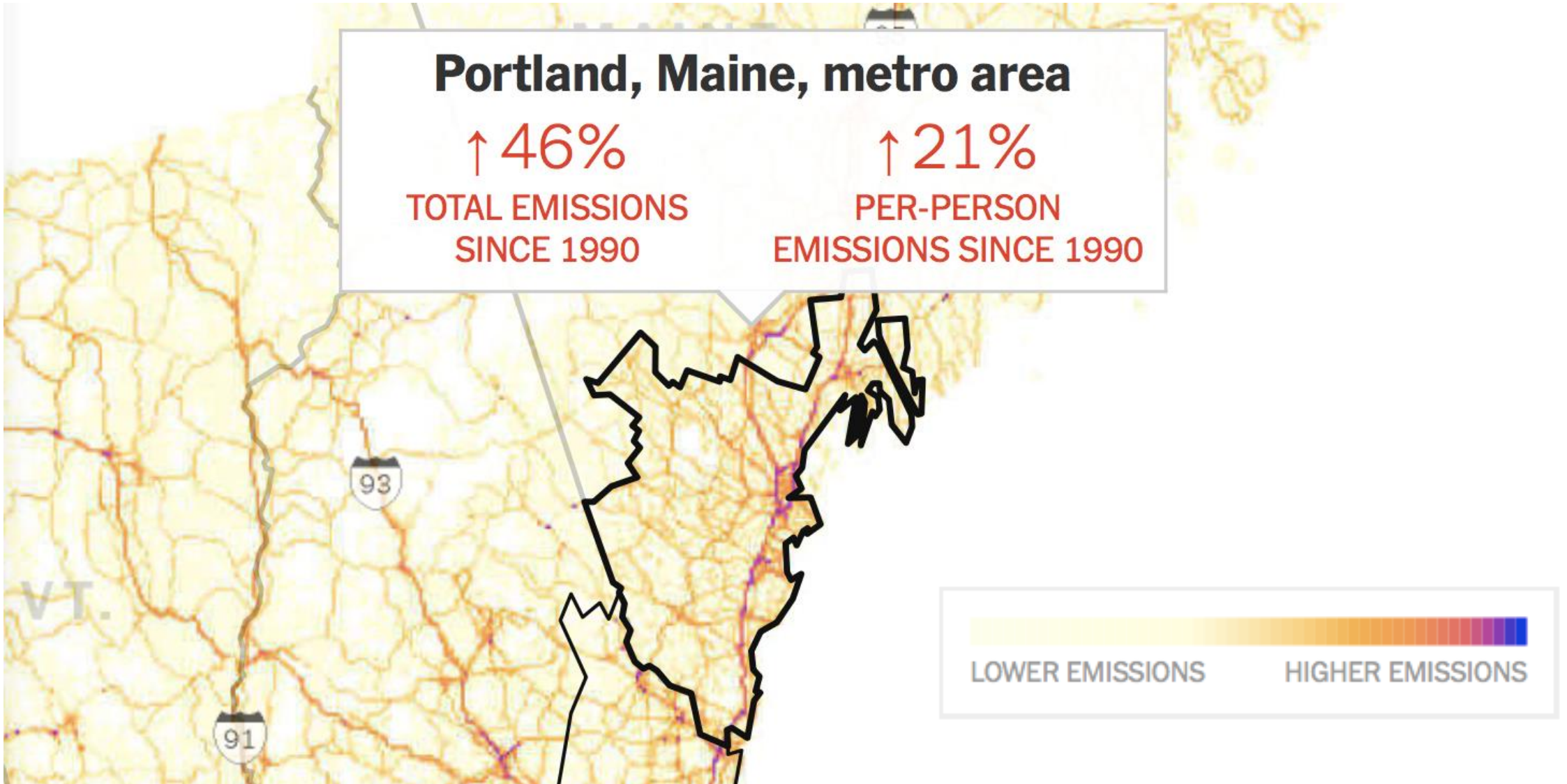
Rideshare

- Rideshare – 0.2

Different modes

- Walking – 0.3
- Biking – 0.2
- Transit – 0.06 - 0.11

People are driving more



Why would people drive less?

Driving costs more

Live close

Transit

Work close

Develop Criteria & Methodology for Selecting Strategies

Potential Criteria

- **Quick** actions and quick results
- Expected **timeline for benefit** (and conversely, consideration of whether we're locking in something less desirable)
- **Proven** in other places
- **Ease** of implementation (fewer decisionmakers, less disruptive lifestyle changes, ability for state to control or influence, appeal to residents)
- **Bang for the buck**
- Possible compounding/ **synergy** between strategies
- Possible **rebound effects**
- **Co-benefits**
- Advances more **equitable** way for paying for transportation
- Is **Lead by Example** opportunity
- Impact on **peak load**
- Supports **climate adaptation**

Method

Quantitative

Can we use an interactive model to help us understand:

- Data validation
- Common metric
- How strategies interact
- Possible rebound/ induced travel impacts
- The impacts of amping up or amping down a strategy

Qualitative

Develop scoring of co-benefits with common framework and scale

- Resiliency
- Jobs
- Transition

5. Prioritize Strategies

Visualizing